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Urban Health Inequalities in Canada: A Scoping Review of the Literature

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Urban Health Inequalities in Canada: A Scoping Review of the Literature¹²³

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Urban Health Inequalities in Canada: A Scoping Review of the Literature

Abstract

We conducted a scoping review of the peer-reviewed and grey literature to take stock of research in Canada on health inequalities at the city level. We used Pubmed to conduct our peer-reviewed literature search and a combination of Google, ProQuest and health region websites to find grey literature articles and reports. In total, we identified 50 articles that met our inclusion criteria. We analyzed these articles for themes of geography studies, type of socioeconomic status measured, type of analysis and health outcome. We found that there is little consistency in the geographical distribution of areas of studies, methods used by researchers or health topics covered. In order for health inequalities to be addressed, more consistency is needed in methods of calculation and coverage. This will allow Public Health workers and Regional Health authorities to track health inequality over time and compare outcomes between geographical regions.

Keywords

Healthcare Inequality, Cities, Urban Health, Canada, Review

Introduction

In recent years, increased data availability has led to new opportunities for city-level health research in Canada. In anticipation of this work, we wanted to take stock of the work that has been done so far with a particular emphasis on inequality research and findings. Health inequalities pinpoint health outcomes in which specific demographics are performing worse than others.^{1,2} This makes them a useful tool for gauging where improvements to health can be made.³ Inequalities can stem from a variety of factors including socioeconomic status (SES) and geographical location.

Several reports concerning health inequalities have been released in recent years. PHAC has developed a Health Inequalities Data Tool,⁴ which compares inequalities in health at a provincial and national level but the latest data included was published in 2013. In 2015, CIHI published an Inequalities Interactive Tool and a report, Trends in Income-related Health Inequalities,⁵ describing health at the national and provincial levels. In 2018 PHAC released a national report titled Key Health Inequalities in Canada.⁶ One of the most comprehensive reports surrounding health inequalities was published in 2008 CIHI released Reducing Gaps in Health: A Focus on Socio-economic Status in Urban Canada.⁷ The follow-up to this report, Urban Income-related Health Inequalities in Canada, was released in 2020.⁸

The aim of this study was to take stock of the research on this subject to date. In doing so, we hope to identify and bring to light gaps or inconsistencies in the literature that may need to be addressed.

Methods

Best practices surrounding scoping literature reviews are well documented.^{9,10} We followed the methodology first described by Arksey & O'Malley¹⁰ and updated by Levac et al.⁹ More specifically, our scoping review followed the five stages: 1) Identifying the research question, 2) Identifying relevant studies, 3) Study Selection, 4) Charting the Data, 5) Collating, summarizing and reporting results.⁹

Identifying Relevant Studies

We conducted parallel searches to identify relevant literature on socioeconomic and income-related health inequalities in Canada's cities. We used Pubmed to identify peer-reviewed journal articles. We also used a combination of Google and the search functions on the websites of individual urban health regions to identify grey literature. Our initial search was conducted in September 2018.

First, we identified peer-reviewed articles using the search database, Pubmed. Articles were identified using the advanced search function, querying articles that included the words "health" with either "disparity" "disparities" "inequality" or "inequalities" in the title or abstract in conjunction with any one of the following geography names: Brampton, Burnaby, Canada, Calgary, Edmonton, Fredericton, Halifax, Hamilton, Laval, London, Longueuil, Mississauga, Moncton, Montreal, Newfoundland and Labrador, Ottawa, Quebec City, Regina, Saskatoon, Sherbrooke, St. John's, Surrey, Toronto, Vancouver and Winnipeg.⁴ Search restrictions included only articles published in the year 2000 or later, had full text available, were written in English and were classified as human research. At the time this search was conducted in 2018, Pubmed identified 4890 articles.

Study Selection

We then read the abstract of the 4890 articles to determine if they met our predetermined inclusion criteria of:

- the data contained exclusively Canadian populations,
- the article includes a measure of SES,
- the analysis was conducted at a geographical level of the city (or smaller), and
- the article was available through the University of Saskatchewan Library.

Of the original 4890 articles located by our Pubmed search, only 124 conducted an analysis that met these criteria. We further excluded articles that did not list a specific health outcome, such as obesity or smoking, and then compare that outcome between populations. We were left with 31 articles. [Figure one](#) outlines this process.

Grey Literature Identification

We know from experience that much of the literature on health inequalities in Canada is grey literature published by various health regions and departments throughout the country. Our second search aimed to find these materials and so we used a combination of Google and the search functions on the websites of individual urban health regions to identify grey literature.

⁴ Additional restrictions were added for London and Surrey to restrict searches to not include articles that had the words "England" or "UK". These reduced the number of results for the "London" search from 136 to 33, and for the "Surrey" search from 70 to 8.

We conducted three searches for each city.⁵ We conducted the first search using google's search engine and restricted the results to the first three pages. We included the terms “health inequality” in conjunction with the city name and province for our google search. The second search was conducted using the Public Health Database (ProQuest) and we restricted articles to the timeline 2001-2017 with the same search terms. Our third and final grey literature search was conducted using the local health region website for each city. We searched their websites for research, reports and publications.

We were able to identify a further 19 articles and reports from the grey literature and researchers' prior knowledge.

Charting the Data

Altogether, we identified 50 articles that met our inclusion criteria. We extracted information from each article and report according to six variables: the population studied, the geographic location over which the study was conducted, the health outcome or outcomes that the study measured, the measure of SES used, the source of data, and the main findings. We then charted the data on geographic area, health outcome, SES measure, and data source.

Collating, summarizing and reporting results

The variety of outcome variables and the lack of uniformity in data collection, geography examined and analyses between the papers made the statistical results incomparable. Therefore, instead of combining the results to create a meta-analysis, we chose to highlight prominent papers on an ad hoc basis, discuss key themes, and identify gaps for future research to address.

Results

Geographic Distribution of Studies

[Table 1](#) shows that peer-reviewed research is not equally distributed across the country. Several peer-reviewed studies have been conducted in each of Canada's largest cities, particularly those that contain large academic institutions. In fact, over half of these studies were conducted in Toronto, Montreal, or Vancouver, resulting in a disproportionate amount of the research focusing on Ontario, Quebec, and British Columbia. In contrast, the Atlantic and Prairie regions, with the exception of Saskatchewan, are underrepresented in peer-reviewed research. There have been no studies in Atlantic Canada conducted since 2000 and only three peer-reviewed studies were conducted in Alberta and Manitoba. These patterns are not as strictly followed in the non-peer-reviewed grey literature where most reports are released from Saskatoon, followed by Toronto and Hamilton. There are also a number of reports released by smaller cities, including Fredericton and St. John's, cities that are not represented by peer-reviewed articles.

A few studies examined more than one geographical area. Moeller & Quinonez¹¹ compared income inequality and oral health in eleven cities in Ontario and British Columbia. The authors contrasted oral health to general health inequalities, the effects of which they suggested are partially mitigated by Canada's universal health care system.¹¹ Pampalo, Hamel and Gamache¹² also evaluated multiple geographical areas. They highlighted the importance of

⁵ When evaluating the grey literature, we narrowed our search to cities included in the Urban Public Health Network: Victoria, Vancouver, Surrey, Calgary, Edmonton, Winnipeg, London, Hamilton, Mississauga, Toronto, Ottawa, Halifax, St. John's, Fredericton, Montreal

geographical specificity and their results found different levels of inequality in both different geographical areas (urban/rural continuum) and between individual or area-based measures of inequality.¹²

Measures of SES

One of the inclusion criteria was that the studies must have used a form of SES to quantify inequality. [Table 2](#) indicates that the main ways to quantify SES were the deprivation indexes, education status, and income status, with almost all the studies using income or education in some form. Studies also varied in the quantity indicators used to determine SES. We discovered that two-thirds of the studies used more than one variable to construct an indication of SES, often in the form of a deprivation index.

70% of the articles used some form of income in calculating SES. Unsurprisingly due to the large number of ways to quantify income and the lack of consensus as to how this should be done in health research, we found a variety of methods used to calculate income. Methods varied widely in the level of income used; some articles relied on individual, family or household while others used area-based measures evaluating neighbourhood and census tract income. Some articles used a proxy calculated based on income, such as the percent of the population under Canada's low-income cut-off definition or the percentage of individuals who were unemployed or receiving long-term social assistance. Most studies used income quartiles or quintiles to calculate inequality, but three used two variables to create SES categories, for example defining areas as low-income high migration to high income-low immigration.

Income was the most common variable used independently. When we examined which variable was used most frequently, either independently or in combination with other variables, we again found that income was most frequently used, followed by education. Income's high use was aided in part due to all the deprivation indices including a measure of income. We also found that with only one exception, all of the studies used either income or education in some combination to calculate SES. Interestingly, the article that used a proxy for income chose to quantify it as homeownership and the amount of assets a family could easily convert into cash.

Ten articles used a deprivation index, an established method to quantify SES. Each index uses a combination of variables, generally income and education, among others, to describe the SES variation of a specific geographical area. That is, a deprivation index developed to describe the SES environment in Saskatoon would likely be less accurate in describing the same environment in Toronto. We found that the most common index used in Canada is The Québec Index of Material and Social Deprivation, more commonly known as the Pampalon index.¹³

Education level, an SES measure that was used by eighteen articles, was most consistently reported in a categorical or dichotomous form. The categorical variables were frequently reported as “no high school diploma,” “high school diploma,” “some post-secondary,” and “some university or more” while the dichotomous coding was evaluated on the presence or absence of a high school diploma. Studies typically used the respondent's education level or maternal education when the health variable concerned birth outcomes.

Regardless of the approach to quantify SES, all the studies described decreased health in the lowest measure of SES. However, this is not to say that all measures of SES are equal. Wilson et al¹⁴ evaluated multiple measures of SES on health outcomes. They found that the odds ratio for high vs low SES was not consistently higher for one health outcome compared to another. For example, when evaluating income, the odds of poor self-rated health were lower

than having chronic conditions (OR 2.01 and 2.55 respectively), but this flipped for homeownership (OR 1.55 and 1.22 respectively).

Measures of Inequality

There is debate in the scientific community about the ideal statistical method to calculate inequality, some authors have advocated for specific methods, however, their conclusions are not agreed upon.^{15,16} Perhaps due to a lack of “best practice,” we found that the statistical analyses used were multifarious and their selection was seemingly arbitrary; authors infrequently provided an explanation for the methods they used beyond that of data constraint. The most common form of analysis was a regression model that was presented with descriptive statistics and interpreted with odds ratios. A couple of studies used more sophisticated methods to calculate Gini Coefficients, Concentration Curves, or Population Attributable Risk. Interestingly, one qualitative study used focus groups and compared neighbourhoods on SES.

Data Source

[Table 3](#) describes the source of the data. We found that over half of the studies drew on multiple sources of data for their analysis. The vast majority (86%) of the studies relied on secondary data analysis by administrative, survey or census data. The sixteen studies that reported self-collected data were conducted in Ontario, Vancouver and Montreal.

Health outcomes

As the studies selected were not part of a surveillance program, we assume that the health conditions chosen were of interest to either the authors or the health region that conducted the research, and as such, were diverse. We found that the choice of health outcomes studied varied from very specific (children’s exposure to secondhand smoke in privately owned vehicles) to very broad (self-perceived health). [Table 4](#) describes the distribution of studies within broad categories. We did not find a trend between health outcome studies and survey type. Though most of the studies that were considered birth-related outcomes, such as pre-term birth or low birth weight, were conducted in Quebec, many that considered chronic conditions were conducted in Ontario.

There were a couple of studies that examined multiple health outcomes. The inter-article methodological consistency allowed us to compare inequalities between health outcomes, something that we could not do study-to-study. The key finding from these studies was that the level of inequality present in the city is specific to the health outcome. One paper found significant differences in the rates of hospitalization between SES groups for categories such as suicide attempts, diabetes, Chlamydia, Hepatitis C and teen birth rate, but no significant difference was found for stroke or cancer.¹⁷

Studies also found a difference between health services offered to low and high SES groups. One paper found that the frequency of clinical presentation was consistent across socioeconomic groups, but that the lower socioeconomic group more frequently received the less desirable treatment.¹⁸ Another found an increase in hospitalization and medication among the low SES group but a decrease in physician visits.¹⁹

Discussion

The purpose of this scoping review was to take stock of the current state of city-level health inequality research in Canada. In general, we found that there is little consistency in the methods used for defining SES, calculating inequality or selecting the health indicators studied. We found

that there was a lack of agreement amongst authors as to both the way to calculate SES measures (deprivation index, income, education) and what combination of measures was best to quantify SES (income alone, deprivation index, a combination of income and education, etc). This was to be expected as there is no universally agreed-upon best method for measuring SES. All measures are known to have associated strengths and weaknesses based on factors such as the ease of data collection, precision and stability of the measurement, and if the study is designed at an individual or area-based level.^{3,20}

We also found an unequal distribution of studies conducted among regions and geographical areas. We hypothesize that the uneven distribution of resources for health research could be a key factor in explaining the distribution of studies. Epidemiological studies focusing on just one area, particularly at the city level are time-consuming and costly. Health regions in cities such as Toronto and Hamilton are larger than most in Canada and may have more resources to invest in such research. It should be noted that we did not include articles written only in French, so research from Quebec is likely underreported in this study. Relatedly, most studies were concentrated on one city, with few studies contrasting between cities or among urban and rural geographies. Health Regions in Canada are different geographical and population sizes. However, particularly in Ontario, health regions cover smaller geographic areas, which are typically dominated by either urban or rural populations. As most of the studies conducted in this review were either conducted or collaborated with a Health Region, it is of no surprise that the results would focus on the area associated with the region.

We also evaluated the type of study via the statistical method used to calculate inequalities. The majority of the studies were descriptive in nature and typically focused on one or more health outcomes, describing that outcome in relation to a measure of socioeconomic inequality. Though some studies used a form of multiple regression to describe inequality, few studies looked beyond the measure of SES to consider the determinants that contributed to the inequality. No studies suggested a causal relationship between a measure and inequality.

Looking ahead

More research is needed that moves beyond basic descriptives. The foundation of public health research is to inform decisions in order to strategically improve the health of the population. We know that knowledge of health inequalities is not sufficient to inform policy, as understanding the determinants of inequality is needed to drive change. Therefore, to continue efforts toward decreasing health inequalities, we need to unpack determinants of the inequalities that policies can realistically be expected to act upon. Descriptive statistics and health surveillance are valuable tools, but we propose that more is needed to catalyze the shift to a more equitable society.

We also submit the need for the discipline to settle on a consistent measure for calculating inequality and greater overlap in choices of health outcomes. The unequal distribution of studies, inconsistent methodologies, and a seemingly random miscellany of health outcomes chosen emphasizes the need for systematic tracking of health inequalities over time and across the country. Without harmonious measures, inequalities cannot be compared, either between cities or regions or over time. The ability to accurately compare health inequalities is essential as a foundation for guiding policy intervention, identifying change and having a common language to discuss severities of inequality.

In recent years, the Public Health Agency of Canada (PHAC) has partnered with the Pan-Canadian Public Health Network, Statistics Canada, the Canadian Institute for Health Information, and the First Nations Information Governance Centre to measure health inequalities systematically at the sub-provincial level throughout the country.²¹ The tables produced by this initiative are useful to guide national indicators and reports, but not sufficient to inform local-level decisions. Local reporting could be brought more in line with the rest of the country if it looks to these reports for indicators, methods to group populations, and analytic techniques. We further call for a Canadian national consensus conference where researchers, epidemiologists and local public health leaders could meet to agree on what infrastructure is needed at the local level to guide the development of such a tool and create a nationally standardized approach.

Health inequalities are an important resource in describing areas of health where changes in a region can be made, but they are currently not sufficient to inform policy changes. The research conducted at the city level in Canada is broad in scope and methodology. In order to effectively track changes in health inequalities and make meaningful comparisons, a more systematic approach to inequality research in Canada is needed.

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Table 1. Frequency of Geographical Areas Evaluated by Peer-Reviewed Health Inequality Studies in Canadian Cities.

	Frequency	Study Number	% of total articles (N=50)
Atlantic	0		0%
Quebec	15	3,4,5,7,8,9,11,21,22,23,27,33,34,37,40	30%
Ontario	16	1,2,17,18,19,20,25,29,30,31,38,38,41,42,46,47	32%
Praries	7	10,24,28,43,44, 49, 50	14%
British Columbia	6	12,13,15,16,26,35	12%
Other/Multiple	6	6,14,32,36,45,48	12%

Table 2. Frequency of SES Stratifier used in Peer-Reviewed Health Inequality Studies in Canadian Cities.

	Frequency	Study Number	% of total articles (N=50)
Income	35	1,2,5,6,10,11,12,15,16,18,19,20,21,22,23,24,25,27,28,29,30,32,34,35,37,38, 40,41,42,43,44,46,47,48, 49	70%
Education	18	3,4,8,10,11,12,15,16,19,22,23,25,27,34,39,40,42,47	36%
Employment	7	15,16,19,24,34,37,47	14%
Deprivation Index	10	7,9,14,17,26,31,33,35,36,45	20%
Other	19	5,8,10,11,12,13,15,16,19,20,22,23,30,40,42,44,46,47, 50	38%

Table 3. Frequency of Data Source used in Peer-Reviewed Health Inequality Studies in Canadian Cities

	Frequency	Study Number	% of total articles (N=50)
Unique to Study	15	13,15,16,23,24,25,27,29,30,33,37,40,46,47,50	30%
Administrative Data	24	1,3,4,5,7,8,9,10,14,17,19,20,21,23,26,28,30,38,39,42,43,44,49,50	48%
Secondary Analysis of Survey Data	16	6,12,18,22,31,32,33,34,35,36,41,45,46,47,48,49	32%
Canadian Census	30	4,5,7,8,9,11,14,17,19,21,23,25,26,27,30,31,32,33,34,35,37,38,39,42,43,44,45,46,47,48	60%
Other	12	2,10,11,17,18,19,20,21,22,28,43,44	24%

Table 4. Frequency of Health Outcome Studied in Peer-Reviewed Health Inequality Studies in Canadian Cities

	Frequency	Study Number	% of total articles (N=50)
Self Percieved Health	9	15,16,18,34,35,45,46,47,49	18%
Mental Health	9	13,16,28,39,44,46,47,48,49	18%
Chronic Condition	10	14,18,19,28,31,34,42,46,47,49	20%
Surgical	2	24,25	4%
Smoking	6	16,17,22,23,33,40	12%
Dental	3	2,29,32	6%
Hospitalization	3	1,43,44	6%
Birth Related	9	3,4,5,8,9,21,26,27,44	18%
Mortality	6	6,17,19,36,41,44	12%
Other	15	7,10,11,12,13,16,17,20,28,30,34,37,38,47, 50	30%